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I felt justified in trusting to what seemed my very distinct recollection of its sense. I had the less hesitation in doing this, as in M. Vogt's subsequently published '*Zoologische Briefe* *,' he gives the received interpretation to the parts of the so-called 'hearts' without any indication of a change of opinion.

I make this statement in explanation of what might otherwise seem to be great carelessness on my part, and for the purpose of further pointing out that M. Vogt not having made the supposed discovery, it is quite impossible that Professor Owen's researches should have been suggested by it.

February 22, 1855.

The LORD WROTTESELEY, President, in the Chair.

Henry John Reynolds Moreton, Earl of Ducie, was balloted for and duly elected a Fellow of the Society.

The following communications were read :—

- I. "On the Temperature and Density of the Seas between Southampton and Bombay *via* the Mediterranean and Red Seas." By MM. ADOLPHE, HERMANN, and ROBERT SCHLAGINTWEIT. Communicated by the Court of Directors of the Honourable East India Company. Presented by Professor STOKES, Sec. R.S. Received January 11, 1855.

In this communication the authors give the results of the observations they had made during their voyage, relative to the temperature and specific gravity of the sea-water, both near the surface and at depths ranging from about 18 to 30 metres, the latter being nearly

* Frankfort, 1851, vol. i. p. 285.

the greatest depth which the motion of the vessel permitted them to reach. They reserve for a future report their observations on the temperature and moisture of the air, as well as the results of two experiments on the quantity of carbonic acid contained in the air on the Mediterranean and Red Seas.

The instruments employed in the observations here described were as follows :—

(1.) Four thermometers which had been carefully compared at the Kew Observatory previous to the authors' departure. At Bombay they repeated the determination of the zero-point and of another standard point, and found that the thermometers had not varied.

(2.) A dipping apparatus constructed by Mr. Adie. This apparatus, which held 5 or 6 litres, was furnished with two valves, so arranged that as it descended the water passed freely through, but as soon as a commencement was made of drawing it up the valves closed and rendered it water-tight. The authors assured themselves that the temperature of the enclosed water did not sensibly change during the process of drawing it up.

(3.) An areometer from Mr. T. G. Greiner at Berlin. This instrument permitted the specific gravity to be read off directly to three places of decimals, and the fourth could be supplied by estimation.

To render the observations of specific gravity comparable with one another, it was necessary to reduce them to a common temperature, which occasioned some difficulty, as the exact expansion of sea-water between the limits 20° and 25° C. was not accurately known. By means of a delicate voluminometer, constructed for the purpose by M. Geissler of Berlin, the authors determined the expansion to be 0·000271 for 1° C. For distilled water Halström had found 0·000219. Another set of more direct experiments, made at Bombay, gave for the expansion of sea-water 0·000337. The difference between this value and the preceding the authors refer to a change of volume of the voluminometer itself, and they prefer the latter, which accordingly they use in their reductions.

The authors then give tables of the results of their observations, which are followed by some general remarks.

Atlantic.—The temperature of the Atlantic was found to be—

From lat. 46° to 41° N. $17^{\circ}\cdot 5$ to $18^{\circ}\cdot 5$ C.

From lat. 39° to 37° 20° to 21° C.

Mean specific gravity reduced to $17^{\circ}\cdot 5$ C. = $1\cdot 0277$.

The temperature and specific gravity showed very little variation in the open sea, so long as no currents were met with, but in the vicinity of land, disturbances of various kinds were noticed. In harbours and in small bays the temperature of the water was found to diminish sensibly at a depth of from 15 to 20 metres, but in the open sea the temperature at the very surface was generally found somewhat lower than at a depth of 30 metres, which no doubt was due to evaporation.

Straits of Gibraltar.—A current with a mean velocity of from three to six miles an hour usually flows through the Straits from the Atlantic into the Mediterranean. A counter current is supposed to exist underneath, but the great depth of the Straits prevented the authors from reaching any such current with their dipping apparatus.

East of the Straits the water of the Atlantic was met with in several places, in close proximity with water of the Mediterranean, from which it was distinguished by its temperature and colour. The stream from the Atlantic on passing the Straits seems to divide itself into several branches.

In connexion with the variability of the currents in the Straits, it is worthy of remark that the *unreduced* specific gravity of the water of the Mediterranean and of the Atlantic is nearly the same.

Mediterranean :—

From the Straits of Gibraltar to Malta—

Temperature of the water $21^{\circ}\cdot 7$ to 22° C.

Specific gravity reduced to $17^{\circ}\cdot 5$ C. . . $1\cdot 0287$.

From Malta to Alexandria—

Temperature 23° to 24° C.

Reduced specific gravity $1\cdot 0298$.

Red Sea.—The maximum of specific gravity found during the

voyage was in the northern end of the Gulf of Suez, 1·0393 (reduced).

From lat. 27° to 23° N., temperature 24° to 28° C.: reduced sp. gr. 1·0315.

From lat. 22° to 14° temperature 30° to 31°·5 C.: reduced sp. gr. 1·0306.

Straits of Bab-el-Mandeb.—The water of the Gulf of Aden being less dense, though colder, than that of the Red Sea, flows into the latter on both sides of the Island of Perim. This colder water could be detected half a degree north of the Straits. After some further remarks about this current, the authors pass on to the

Arabian Sea—in which they found

From long. 44° to 50° East from Greenwich, temp. 28°·8, reduced sp. gr. 1·0275.

From the merid. of Cape Guardafui to Bombay, temp. 27° to 28°, red. sp. gr. 1·0278.

- II. A paper was in part read, entitled “On the Structure, Functions, and Homology of the Manducatory Organs in the Class Rotifera.” By P. H. Gosse, Esq. Communicated by THOMAS BELL, Esq., V.P.R.S. Received January 5, 1855.